

EOC Compatibility Test 1 - ECT1

Background Information:

ECT1 is the first in a series of 3 ground system compatibility tests for the AM-1 spacecraft. These tests gradually add more elements and functionality in preparation for the AM-1 End-to-End Test. (AM-1 ETE)

Test Objectives:

The first EOC Compatibility Test (ECT) test is an initial command and telemetry test with the spacecraft at the SCS in Valley Forge, Pa. The communications for this test will be with base-band data over land-line circuits. The following objectives have been established for ECT1:

Primary Objectives:

- Demonstrate that the EBnet circuits can reliably support data communications between the SCS, EDOS, and the EOC.
- Demonstrate that EDOS can perform data capture and real time packet processing of 16 kbps housekeeping telemetry.
- Demonstrate that EDOS can perform forward link processing of command data at 2 kbps. [**Note:** 2kbps contingency mode commanding is what the hard-line forward link is optimized for].
- Demonstrate that the EOC can perform telemetry decommutation, limit checking, EU conversion and display for 16 kbps housekeeping data from the AM-1 spacecraft.
- Demonstrate that the EOC can perform simple real-time commanding of the AM-1 spacecraft.

Commanding activities for ECT1 will be limited to real time commands from ECL directives using the CCSDS PLOP-1 protocol (one CLTU per command block)

Commanding will be performed at the 2kbps rate as a primary objective.

Secondary Objectives:

- Demonstrate that the EOC can maintain telemetry display update rates.

Pages will be set to update at 2 second rates while processing 16 kbps telemetry

- Commanding at the 1 kbps, and 10 kbps uplink rates.

- Demonstrate that EDOS can perform data capture and real time packet processing of 1 kbps health and safety telemetry.
- Demonstrate that the EOC can perform telemetry decommutation, limit checking, EU conversion and display for 1 kbps health and safety data from the AM-1 spacecraft.

Test Configuration:

The overall communications configuration to support ECT1 is shown in Figures 1-4 below. Figures 1(a) and 1(b) show the overview configuration, Figure 2 shows the data paths and processing elements within the EOC, Figure 3 shows the spacecraft, SCS, and data paths at LMMSC-VFPA, and Figure 4 shows the EDOS Version 2 configuration.

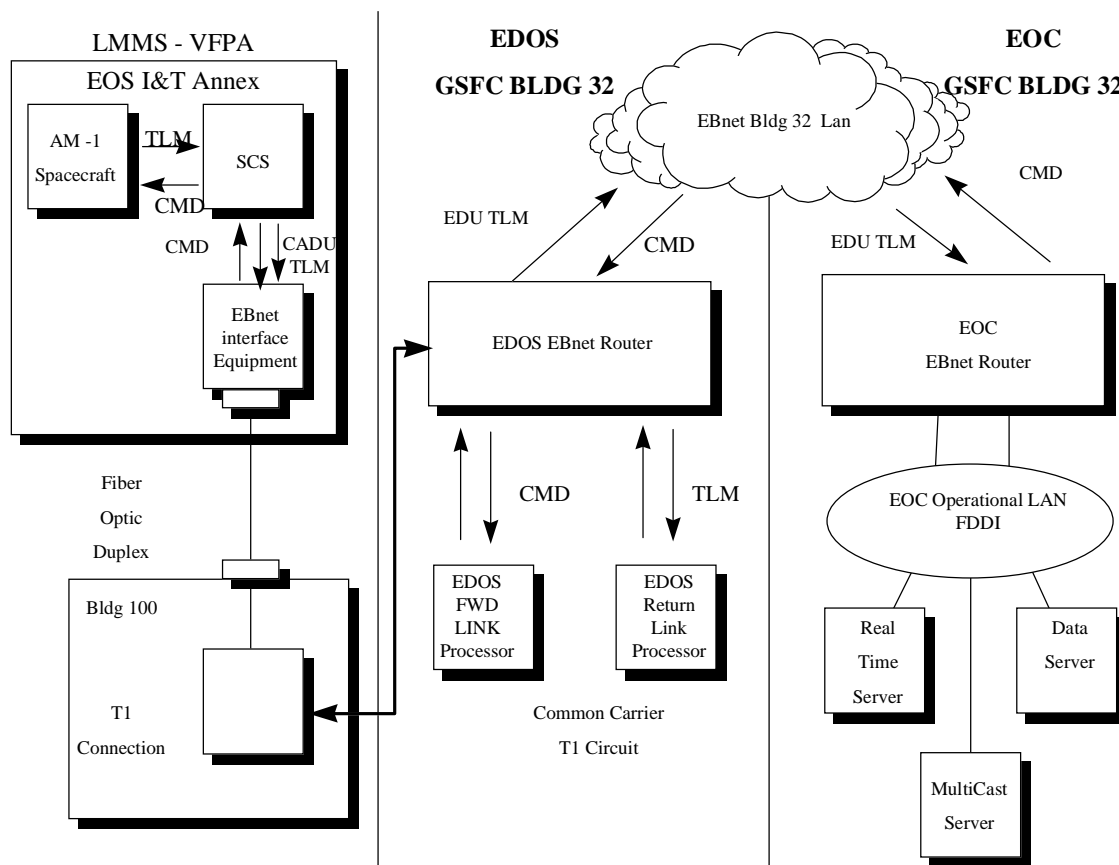
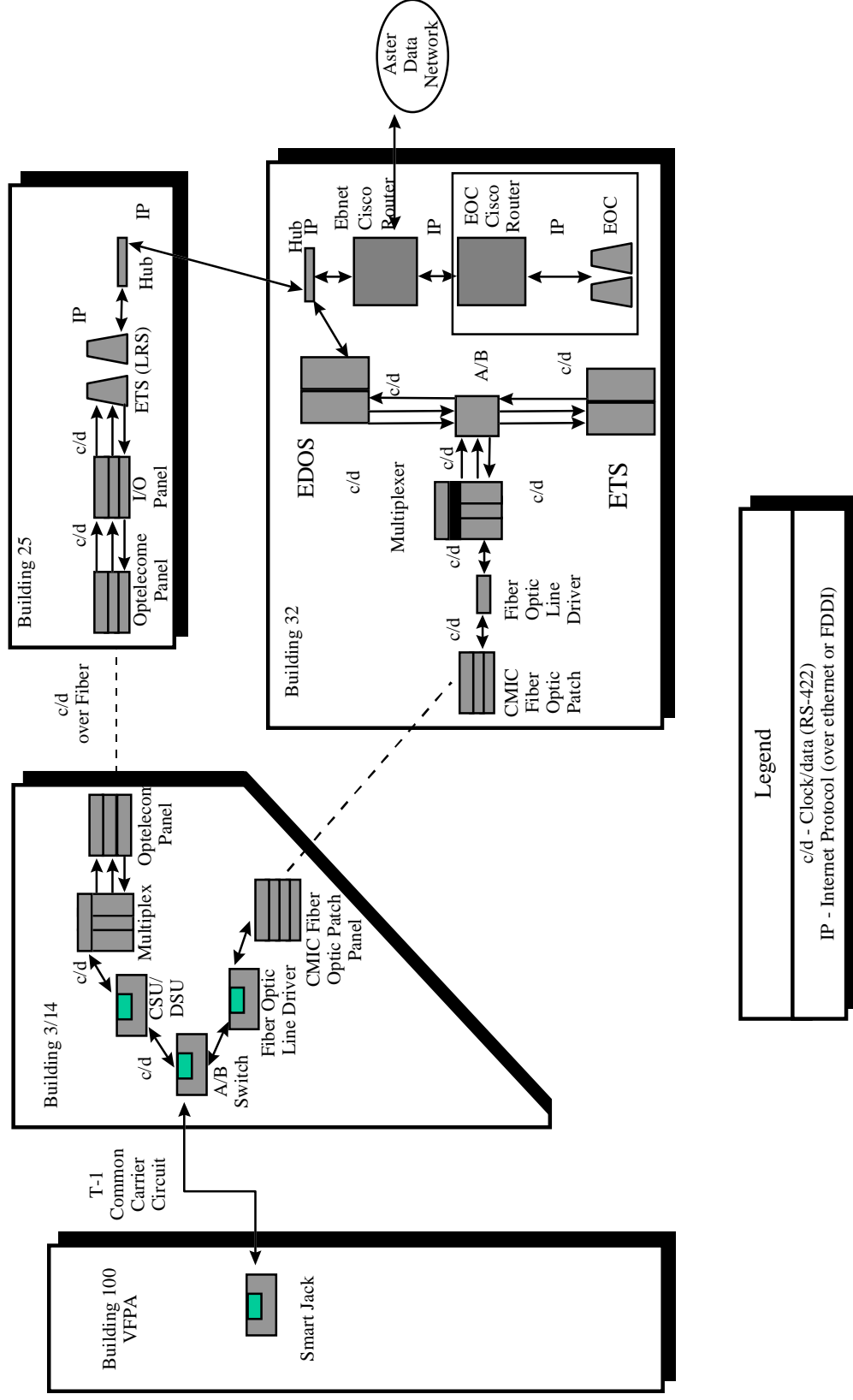


Figure 1(a): Overview ECT1 Communications Configuration



**Figure 1(b): Overview ECT1 Communications Configuration
EBnet "wiring diagram"**

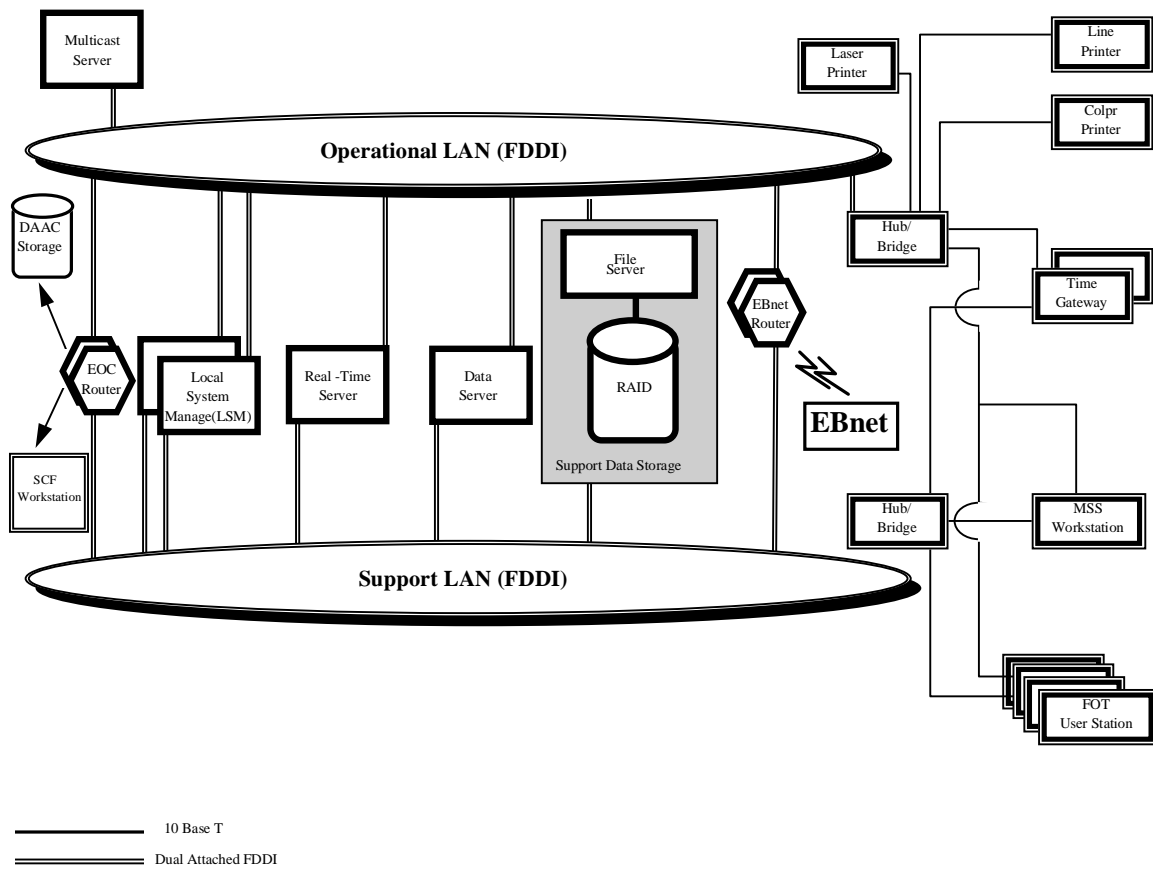


Figure 2: EOC Configuration for ECT1 (FOS Release A)

Data / Voice Communications Paths

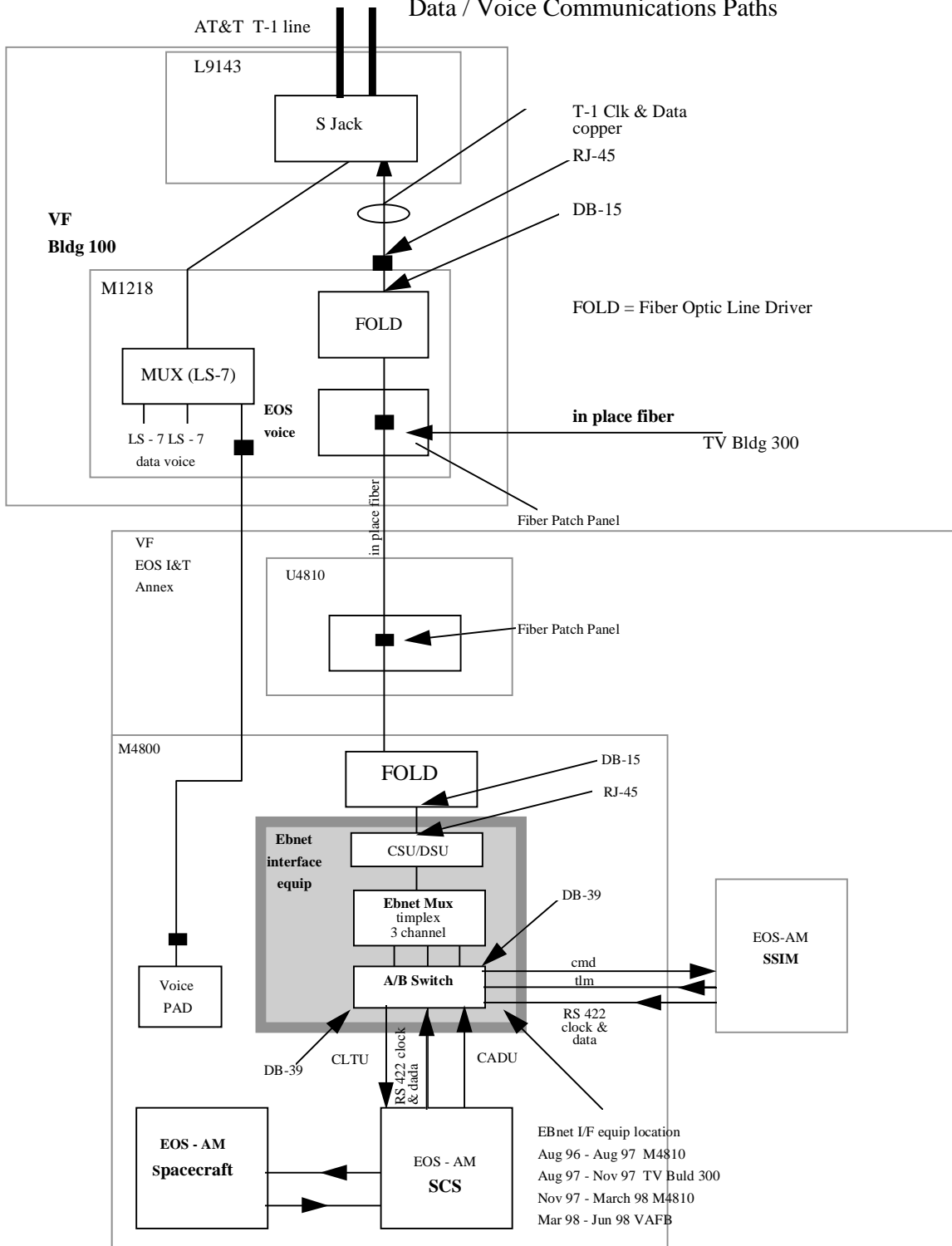
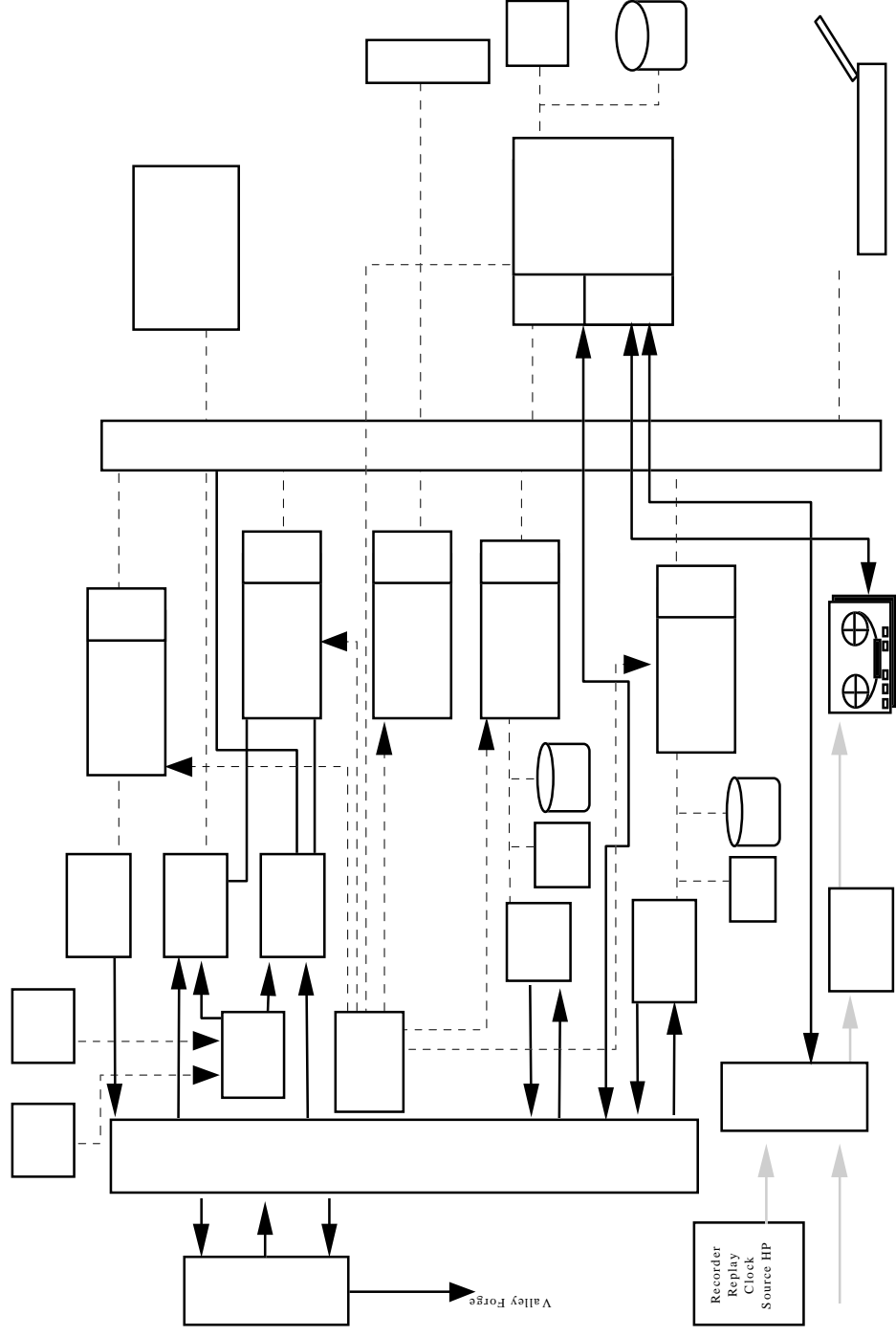


Figure 3 - Test Configuration at LMMSC - VFPA



Participants and Support Requirements:

Participants:

Lockheed - Martin:	LMMS-VF	Spacecraft I&T Spacecraft Operations
	LMSMS	FOT/Greenbelt FOS Development/Landover

TRW: EDOS Developer Support

AlliedSignal (CNMOS) EDOS Operations

CSC (CNMOS) EDOS I&T

GSFC 540 EBnet Operations
Nascom Voice Operations

GSFC 505 EGS Test Director

Communications:

Voice: SCAMA 264 - EOC / EDOS / VF TEST FACILITIES

CCL 74 - EOC / EDOS
CCL 75 - EOC / EDOS / EQUIPT ROOM
CCL 94 - EOC / EDOS / ETS
CCL 113 - EOC / EDOS / EBnet

“Black phone” numbers:

SCS - I&T Annex VFPA	610-354-7920 / 7937
Building 100 VFPA	610-354-1911 (E. Keeling)
EDOS Operations Area	301-614-5432
EBnet Operations Area	301-614
AM-1 Operations Area (EOC)	301-614-5431
Nascom Manager	301-286-6141
Nascom Voice Control	301-286-8737

Voice Calls:	EOC Operations Center	“EOC”
	EOS Data and Operations System	“EDOS”
	AM1 I&T Facilities	“AM-1”
	EOSDIS Test System	“ETS”
	ECT1 Test Director	“TD”

Data: EBnet connection to Spacecraft Checkout Station
EBnet - EDOS connection
EBnet - EOC connection

(IP addresses are available from element system administrators and from Chris Garman for EBnet)

AT&T T1 circuit - VFPA - GSFC
(AT&T designation - DATM 956 786)
(Bell Atlantic designation - 11HCGF211 056)

Equipment and Software:

EOC: Equipment to support command and telemetry logical strings

Real Time Server
Data Server
Workstation for Command Activity Controller
Workstation for Spacecraft Evaluator

User Interface Sub-system software
Telemetry Sub-system software
Command and Command Management Sub-system software
Resource Management Sub-system software

(FOS Release A Version 1.01.00)

Project Data Base Version 5.0

EDOS

Return Link Processor (RLP) with Version 2 software
Forward Link Processor (FLP) with Version 2 software

AM-1 Spacecraft I&T Facility

AM-1 Spacecraft (Communications / C&DH Module)
SCS Command Filter Software Version _____
Spacecraft Checkout Station Software Version _____
EBnet Interface Equipment

Test Data:

Description / Characteristics	Source	File/script name & Location
AM-1 Spacecraft Commands (Command Rates 125 bps, 1 kbps, 2 kbps and 10 kbps)	EOC - command list provided by S/C I&T.	Executed from ECL PROC ECT1CMD
AM-1 Spacecraft Housekeeping Telemetry (16 kbps)	AM-1 Spacecraft	N/A
AM-1 health and safety telemetry (1 kbps)	AM-1 Spacecraft	N/A

Timeline:

Event	TLM 1 (I channel)	TLM 2 (Q channel)	Forward Link (Commands)
Event 1	16K HK		
Event 2		16K HK	
Event 3	16K HK	16K HK	2K TO SPACECRAFT
Event 4	16K HK	16K HK	10K TO SPACECRAFT
Event 5	1K H&S		
Event 6		1K H&S	1K TO SPACECRAFT
Event 7	1K H&S	1K H&S	125 BPS TO SPACECRAFT